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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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HEWLETT-PACKARD COMPANY
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EXAMINER

CHANG, JUNGWON

ART UNIT PAPER NUMBER

2154

DATE MAILED: 10/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/849,171

Applicant(s)

VOGE, BRENDAN ALEXANDER

Examiner

Jungwon Chang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 August 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28,31,34 and 37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28,31,34 and 37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

FINAL ACTION

1. This office action is responsive to amendment filed on 8/30/2005. Examiner failed to consider newly added claims 29-37 filed on 4/8/2005. Thus this office action is supplemental final rejection.
2. Claims 29, 30, 32, 33, 35 and 36 have been canceled. Claims 1-28, 31, 34 and 37 are presented for examination.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-28, 31, 34 and 37 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. "Claims 1, 10 and 19 recite, "wherein said shared memory links provide higher bandwidth than the network connection" that is not described or supported in the specification.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-6, 10-15, 19-25, 31, 34 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogus (US 6,587,875) in view of Baumgartner et al. (US 6,334,177), hereinafter Baumgartner.

7. As to claims 1 and 19, Ogus discloses the invention substantially as claimed, including a method for operating a network (Ethernet; 18, fig. 2; Token ring; 34, fig. 3; 106; 108; fig. 6) connecting a plurality of processor cells (computer A-D; fig. 9) that are already configured in a multiprocessor system (fig. 9; col. 20, lines 43-44) with a plurality of links (AB-AD; BA-BD; CA-CD; DA-DC; fig. 9; col. 18, lines 29-37), comprising:

recognizing by software operating (335, 336, 337, fig. 14; col. 6, lines 6-15) on at least one processor cell (computer A-D; fig. 9) when a network operation can use a link of said plurality of links to implement a network operation (col. 3, lines 4-19; col. 3, line 66 – col. 4, line 6); and

utilizing said link of said plurality of links to perform said network operation (col. 6, lines 27-52; col. 18, lines 29-44; col. 22, lines 58-61), wherein utilizing said link further comprises avoiding the use of a network connection in the network (detecting link

saturation; col. 2, lines 51-56; along with a wait time for stalling issuance of any new messages until the backlogged messages are cleared; col. 3, lines 56-65; waiting time corresponds to the amount of time we should stop sending messages to clear out the backlog on the link; col. 12, lines 18-27; the bottleneck may cause data to be dropped...dealing with drops due to link overload; col. 14, lines 52-67).

8. Ogus discloses a plurality of links (AB-AD; BA-BD; CA-CD; DA-DC; fig. 9; col. 18, lines 29-37) and high bandwidth (col. 2, lines 49-56; col. 12, lines 41-50; col. 19, lines 33-57). However, Ogus does not specifically disclose shared memory links for transmitting memory requests and memory responses between the processor cells, wherein the link connects a high bandwidth integrated circuit of the one processor cell with another high bandwidth integrated circuit of another processor cell; and wherein said shared memory links provide higher bandwidth than the network connection.

9. Baumgartner discloses shared memory links (col. 1, lines 30-40 and 52-63; col. 2, lines 64-67; col. 3, lines 20-34) for transmitting memory requests and memory responses between the processor cells (read or write; col. 2, lines 6-19; col. 1, lines 41-63), wherein the link connects a high bandwidth integrated circuit of the one processor cell with another high bandwidth integrated circuit of another processor cell (16, fig. 1; col. 1, lines 41-52; col. 3, lines 13-19); and wherein said shared memory links provide higher bandwidth than the network connection (SMP nodes interconnected with a high bandwidth interconnection; col. 1, lines 30-63; Scalable Coherent Interconnect 16 is a

high-bandwidth interconnection network; col. 3, lines 13-33). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Ogus and Baumgartner because Baumgartner's shared memory and high bandwidth between two processor cells would allow the multiprocessors to communicate each other with a maximum interconnect bandwidth.

10. As to claim 2, Ogus discloses multiprocessor system (fig. 9; col. 20, lines 43-44). However, Ogus does not specifically disclose a symmetric multiprocessor system. Baumgartner discloses a symmetric multiprocessor system (parallel multiprocessors; col. 1, line 41 – col. 2, line 5). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Ogus and Baumgartner because Baumgartner's symmetric multiprocessor system would improve the scalability of Ogus' system by providing equal processor load balancing, thereby reducing response time.

11. As to claim 3, Ogus discloses said software is an operating system (335, fig. 14; col. 6, lines 6-15).

12. As to claim 4, Ogus discloses said network is an Ethernet local area network (Ethernet; 18, fig. 2; col. 6, lines 44-51).

13. As to claim 5, Ogus discloses said multiprocessor system includes at least two

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processor cells interconnected in a configuration chosen from a group of configurations consisting of: a fully interconnected configuration (fig. 9), a cross-bar configuration, a mesh configuration, or a ring configuration.

14. As to claim 6, Ogus discloses determining whether said link provides sufficient bandwidth to complete said network operation (col. 2, lines 49-56; col. 3, lines 4-19; col. 8, line 65 – col. 9, line 2; col. 14, lines 52-65).

15. As to claim 10, it is rejected for the same reasons set forth in claim 1 above. In addition, Ogus discloses installing software on at least one processor cell of said plurality of processor cell (335, 336, 337, fig. 14; col. 6, lines 6-15), wherein said software is aware of said plurality of links between said plurality of processor cells (col. 2, lines 49-56; col. 3, lines 4-19; col. 8, line 65 – col. 9, line 2; col. 14, lines 52-65).

16. As to claims 11 and 20, it is rejected for the same reasons set forth in claim 2 above.

17. As to claims 12 and 22, it is rejected for the same reasons set forth in claim 3 above.

18. As to claims 13 and 21, it is rejected for the same reasons set forth in claim 4 above.

19. As to claims 14 and 24, it is rejected for the same reasons set forth in claim 5 above.

20. As to claims 15 and 25, it is rejected for the same reasons set forth in claim 6 above.

21. As to claim 23, Ogus discloses said operating system is installed on at least one processor cell of said plurality of processor cells (335, fig. 14; col. 6, lines 6-15).

22. As to claims 31, 34 and 37, it is rejected for the same reasons set forth in claims 1 and 19 above. In addition, Ogus discloses a computer with a capability of graphic processing that inherently implements on the application specific integrated circuit (col. 1, lines 29-45).

23. Claims 7-9, 16-18 and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogus (US 6,587,875), Baumgartner et al. (US 6,334,177), further in view of Dally et al. (US 6,370,145), hereinafter Dally.

24. As to claim 7, Ogus discloses a first link of said plurality of links does not provide sufficient bandwidth to perform said network operation (link saturation; col. 14, lines 52-65; col. 19, lines 28-31). However, Ogus and Baumgartner do not specifically disclose

choosing a second link from said plurality of links when a first link of said plurality of links does not provide sufficient bandwidth to perform said network operation. Dally discloses choosing a second link (alternative path; col. 6, lines 66-67) from said plurality of links (col. 6, lines 30-39) when a first link of said plurality of links does not provide sufficient bandwidth to perform said network operation (congestion; bottleneck; col. 5, lines 24-43) (col. 5, lines 44-53; col. 6, lines 59-67). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Ogus, Baumgartner and Dally because Dally's backup link would improve reliability of the system by allowing for an alternative path to improve fault tolerance and load balance (Dally; col. 6, lines 66-67).

25. As to claim 8, Ogus and Baumgartner do not specifically disclose suspending said network operation when said link of said plurality of links is not providing sufficient bandwidth to perform said network operation; and resuming said network operation when said link of said plurality of links provides sufficient bandwidth to perform said network operation. However, Dally discloses suspending said network operation when said link of said plurality of links is not providing sufficient bandwidth to perform said network operation (stop sending data; col. 2, lines 30-35); and resuming said network operation when said link of said plurality of links provides sufficient bandwidth to perform said network operation (channel state update; col. 10, line 63 – col. 11, lines 20; channel state table; 80, fig. 11B; col. 11, lines 27-37; status of the channel: idle, busy, tail pending; col. 12, lines 23-45; col. 12, line 54 – col. 13, line 26). It would have

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been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Ogus, Baumgartner and Dally because Dally's suspending and resuming the network operation would improve the performance of the system by eliminating wasted time by blocking network operation when aware of the saturation on the link.

26. As to claim 9, they are rejected for the same reasons set forth in claims 7 and 8 above.

27. As to claims 16 and 26, it is rejected for the same reasons set forth in claim 7 above.

28. As to claims 17 and 27, it is rejected for the same reasons set forth in claim 8 above.

29. As to claims 18 and 28, it is rejected for the same reasons set forth in claim 9 above.

30. Applicant's arguments filed on 8/30/2005 have been fully considered but they are not persuasive.

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31. In the remarks, applicants argued in substance that:

- (1) The Ogus-Baumgartner combination does not disclose the step of avoiding the use of a network connection in the network when utilizing the link,
- (2) where the shared memory links provide higher bandwidth than the network connection.

32. Examiner respectfully traverses applicant's remarks:

As to point (1), Ogus clearly discloses the step as described in the cited passage of col. 2, lines 51-56, detecting link saturation; col. 3, lines 56-65, along with a wait time for stalling issuance of any new messages until the backlogged messages are cleared; col. 12, lines 18-27, waiting time corresponds to the amount of time we should stop sending messages to clear out the backlog on the link; col. 14, lines 52-67, the bottleneck may cause data to be dropped...dealing with drops due to link overload). Please see the paragraphs 7-9 above.

As to point (2), Claims 1-28, 31, 34 and 37 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. "Claims 1, 10 and 19 recite, "wherein said shared memory links provide higher bandwidth than the network connection" that is not described or supported in the specification. Furthermore,

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Baumgartner discloses shared memory links provide high bandwidth (SMP nodes interconnected with a high bandwidth interconnection; col. 1, lines 30-63; Scalable Coherent Interconnect 16 is a high-bandwidth interconnection network; col. 3, lines 13-33).

33. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

34. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jungwon Chang whose telephone number is 571-272-3960. The examiner can normally be reached on 9:30-6:00 (Monday-Friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John A Follansbee can be reached on 571-272-3964. The fax phone number for the organization where this application or proceeding is assigned is 703-

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872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jungwon Chang
September 20, 2005

CLB, JWW